SENATE COMMITTEE ON ENERGY, UTILITIES AND COMMUNICATIONS
Senator Josh Becker, Chair
2025 - 2026 Regular

Bill No:	SB 80	**Hearing Date:**	4/21/2025
Author:	Caballero		
Version:	3/17/2025 Amended		
Urgency:	No	**Fiscal:**	Yes
Consultant:	Sarah Smith		

SUBJECT: Energy: Fusion Research and Development Innovation Hub Program

DIGEST: This bill requires the California Energy Commission (CEC) to establish the Fusion Research and Development Innovation Hub Program to provide grants to entities designated as fusion hubs. This bill sets requirements for establishing hubs in geographically diverse portions of the state and specifies requirements for nuclear fusion research and development activities for these hubs.

ANALYSIS:

Existing law:

1) Establishes the CEC as a five-member body appointed by the Governor and specifies the duties of the CEC, which includes, but is not limited to conducting research and development or contracting for research and development related to alternative energy sources, improvements in energy generation, and other topics related to energy supply, demand, safety, ecology, and conservation. (Public Resources Code §25200 et. seq.)

2) Establishes the Electric Program Investment Charge (EPIC) program, which provides funding for research, development and demonstration projects that advance energy goals while providing benefits to ratepayers. EPIC is funded by a ratepayer surcharge from the state's investor-owned utilities (IOUs). (Public Resources Code §25711)

3) Defines "Fusion" and "Fusion Energy" and requires the CEC to include an assessment in the 2027 Integrated Energy Policy Report (IEPR) regarding the potential for fusion energy to contribute to California's power supply. (Public Resources Code §25302.4)

4) Authorizes the Governor's Office of Business and Economic Development (GO-Biz) to take steps necessary to apply for federal regional clean hydrogen hubs funding. Existing law defines "clean hydrogen" for the purposes of the

clean hydrogen hub funding as hydrogen produced from Renewable Portfolio Standard (RPS)-eligible energy resources and otherwise consistent with federal law for the clean hydrogen hub program. (Government Code §12100.161–12100.162)

This bill:

1) Establishes the Fusion Research and Development Innovation Hub Program at the CEC to accelerate the development and growth of fusion energy with the goal of delivering the world's first fusion energy pilot plant in California in the 2030s.

2) Requires the CEC to work with GO-Biz and the President of the University of California (UC) to designate three fusion research and development hubs that represent southern California, the Central Valley, and the San Francisco Bay Area. This bill requires the CEC to oversee, coordinate and provide assistance to fusion hubs designated under this bill.

3) Requires the fusion hubs to account for the following in their research and development activities:

   a) The inclusion of existing national fusion infrastructure, including national labs and national scientific user facilities.
   b) Opportunities to develop or expand facilities focused on fusion energy research, development, testing and demonstration projects.
   c) The inclusion of diverse approaches to fusion energy, including magnetic confinement, inertial confinement, novel approaches, and diverse fuel types.
   d) Opportunities to support the future demonstration of the production, processing, delivery, and end use of fusion energy.
   e) The inclusion of apprenticeship programs and partnerships with academic institutions, including vocational schools and community colleges, to support workforce development and create new job pathways.
   f) Entities that are likely to create or preserve opportunities for skilled training and long-term employment to the greatest number of residents of the region.
   g) Opportunities to develop or expand research and testing facilities to address key gaps in science and technology applicable to multiple fusion energy concepts.

4) Authorizes the CEC to use specified federal fusion research reports to determine priorities for fusion hub activities.

5) Requires entities designated as fusion hubs under this bill to do the following:

a) Support the advancement of pre-demonstration commercial fusion energy programs by driving research and development in science, technology, academia, and workforce initiatives aligned with California's workforce goals for clean energy technologies.
b) Leverage state, federal, and private sector investments and incentives to advance research and technology applicable to fusion energy, including public-private partnerships and philanthropic collaborations.
c) Coordinate activities as a statewide network to facilitate a fusion energy economy.

6) Requires the CEC to administer the Fusion Research and Development fund to provide grants to fusion hubs for the purpose of accelerating research and development of technology that supports the commercialization of fusion energy.

7) Specifies that this bill's implementation is contingent upon the Legislature making an appropriation to support the bill through the annual Budget Act or other legislation.

Background

Fusion vs. Fission. Both nuclear fusion and nuclear fission are processes by which atomic nuclei are treated to generate massive quantities of energy. While nuclear fusion occurs when two or more nuclei merge, nuclear fission occurs when a single nucleus is split into two or more nuclei. In the energy sector, nuclear power plants use nuclear reactors to split atoms, which heats water, generates steam, and then turns a turbine that creates electricity. Nuclear fission requires a substantial amount of energy to heat and compress atoms into plasma and force nuclei to collide with each other. Scientists have pursued both fission and fusion energy for the ability to produce carbon-free electricity; however, if achieved, fusion can generate substantially more energy than fission.

Keeping the lights on will require more than ignition. Nuclear fission has existed as a commercial energy source for more than 70 years. By contrast, nuclear fusion is a relatively nascent energy technology. Researchers worked to create successful nuclear fusion experiments for decades before scientists at the National Ignition Facility at Lawrence Livermore National Laboratory (LLNL) achieved a nuclear fusion reaction that produced more energy than it required to create the reaction. The process of producing this additional energy is known as "ignition." The achievement of ignition represents a major scientific breakthrough in fusion research; however, it is not yet clear that fusion can produce reliable net energy sufficient to supply electricity in a manner that can be commercialized. Despite

the early stage of fusion as an energy resource, a number of private companies are seeking to develop nuclear fusion energy technology.

Bill aims to establish hubs for developing nuclear fusion technology. This bill would require the CEC to designate three entities as fusion hubs for the purposes of accelerating research and development into fusion energy, including the commercialization of fusion energy. This bill requires the CEC to designate these hubs in diverse regions of the state, including in the San Francisco Bay Area, the Central Valley, and southern California. While a number of companies and institutions are participating in research related to nuclear fusion, only a limited number of entities operate labs capable of achieving ignition. Of these labs, only the National Ignition Facility has achieved ignition through nuclear fusion. This bill does not limit hub designation to only those facilities that maintain fusion reactor. As a result, facilities that conduct research that may support laboratories with reactors could also qualify for hub designation.

Bill mirrors existing proposal to federal government. In 2024, the Biden Administration's Department of Energy solicited comments on a request for information (RFI) regarding the development of a public-private consortium framework for fusion technology. Responses to this RFI included comments submitted by General Atomics on behalf of the Pacific Coalition for Advancing Research, Education, Science, and Technology (CREST) for Fusion Energy. General Atomics is a San Diego-based company that operates a fusion laboratory on behalf of the federal Department of Energy (DOE), and the company is one of many members of Pacific CREST. The UC Office of the President and LLNL are also members of Pacific CREST. Comments from Pacific CREST to the RFI proposed the creation of a public-private partnership program modeled on California's Alliance for Renewable Clean Hydrogen Energy Systems (ARCHES) hydrogen hub program, which is overseen by GO-Biz. The fusion hub program required by this bill closely mirrors the program proposed by Pacific CREST.

Bill conditions its implementation on a legislative appropriation. Since the transition from the Biden Administration to the Trump Administration, the status of federal efforts to accelerate nuclear fusion research public-private partnerships has become less clear. As currently written, this bill would require the CEC to administer a fund to provide grants that would support the fusion hubs and associated research and development into fusion energy; however, this bill does not currently specify a funding source for these grants. This bill specifies that its implementation is conditioned upon the Legislature making an appropriation to the CEC for the purpose of administering the hub program required by this bill.

Need for amendments. This bill establishes a goal of delivering the world's first energy pilot plan in California in the 2030s. This timeframe is a decade earlier than the timeframe noted by the U.S. Fusion Energy Sciences Advisory Committee in its long-range plan, "*Powering the Future: Fusion & Plasmas,"* which calls for constructing the first U.S. fusion pilot plant by the 2040s. *As a result, the author and committee may wish to amend this bill to extend the goal for establishing a pilot plant from the 2030s to the 2040s.*

Prior/Related Legislation

SB 327 (McNerney) of the current legislative session, would require the CEC to enter into an agreement with the federal DOE to establish a center to facilitate nuclear fusion research and development. The bill is pending in this committee.

SCR 25 (Blakespear) of the current legislative session, celebrates the contributions of public and private sector organizations advancing nuclear fusion energy research and supports developing the fusion energy ecosystem with the goal of siting a first-of-its-kind fusion pilot plant in California by the 2040s. The resolution is pending in the Assembly.

SB 86 (McNerney) of the current legislative session, would authorize the California Alternative Energy and Advanced Transportation Financing Authority to provide financial assistance, in the form of exclusions from sales and use tax, to electrical generation facilities using nuclear fusion technology. The bill is pending before the Senate Appropriations Committee.

AB 1172 (Calderon, Chapter 360, Statutes 2023) required the CEC as part of its 2025 IEPR to include an assessment of the potential for fusion energy to contribute to California's power supply.

AB 157 (Committee on Budget, Chapter 570, Statutes of 2022) authorized GO-Biz to take steps to prepare and submit an application to receive funding from the regional clean hydrogen hubs program or to otherwise participate in the regional clean hydrogen hubs program. The bill also established a definition of clean hydrogen.

FISCAL EFFECT: Appropriation: No Fiscal Com.: Yes Local: No

SUPPORT:

General Atomics- Energy Group (Sponsor)
B3k Prosperity

City of Livermore
Cleantech San Diego
Innovation Tri-valley Leadership Group
Livermore Laboratory Foundation
Livermore Valley Chamber of Commerce
Next Step Fusion
San Diego Regional Chamber of Commerce
San Diego State University-division of Research and Innovation
Stanford XLab Engineering
TAE Technologies, if amended
Tokamak Energy
Two Individuals

OPPOSITION:

None received

ARGUMENTS IN SUPPORT: According to the author:

> Fusion energy, considered the "holy grail" of energy solutions, promises virtually unlimited clean energy without long-lived nuclear waste. California has some of the most prestigious universities, and they are training the next generation of scientists in the mechanics of fusion energy. Yet if California does not invest in this emerging technology, students will be forced to leave the state and to continue their careers. Additionally, fusion research has been supported primarily through the federal government with little to no state involvement or facilitation. This bill would authorize GO-Biz to establish regional fusion energy hubs in California and provide grant funding to assist in closing the infrastructure gap to make fusion energy part of California's zero-carbon energy system. California is a leader in technology and green energy; it should similarly lead the nation in fostering fusion energy.

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